21 38. The composite board of Claim 19 36 wherein the methyl methacrylate is present in an amount of from about 65 to about 95 weight percent, the ethyl acrylate is present in an amount of from about 5 to about 35 weight percent and the fumaric acid is present in an amount of from about 0.5 to about 10 weight percent.

22 39. The composite board of Claim 20 37 wherein the styrene is present in an amount of from about 65 to about 95 weight percent, the ethyl acrylate is present in an amount of from about 5 to about 35 weight percent and the acrylic acid is present in an amount of from about 0.5 to about 10 weight percent.

REMARKS

The basis for the amendment to Claim 18 can be found on page 2, lines 16-18 of the specification. The basis for the added claims can be found in the claims as originally written and in the specification on page 6, lines 27-31, and page 7, lines 1-6.

The Examiner has rejected Claims 18-28 under 35 USC §103 as being unpatentable over Hen, U.S. Patent 4,065,423. The Hen patent teaches a latex useful as a binder in *paper-coating* compositions. The monomeric composition of the latex Hen teaches is made up of:

A. 35 to 75 parts of a monovinylidene aromatic monomer (e.g., styrene),

B. correspondingly 65 to 25 parts of an aliphatic conjugated diene, said monomers (A) plus (B) constituting from 75 to 99.5 percent of the total monomeric mixture,

C. 0.5 to 10 percent of an acryloyloxycarboxylic acid type monomer (e.g., beta-carboxyethylacrylate), and, optionally,

D. zero to 15 percent of one or more different hydrophilic monomers (e.g., mono-beta-hydroxyethylmaleate).

Applicants have submitted two affidavits, Affidavit I and Affidavit II, under 37 CFR §1.132 to illustrate that a latex prepared with the highest glass transition temperature ($T_g$) possible given the optional monomeric components of the Hen polymer would not work for the present invention.

Affidavit I demonstrates the preparation of an emulsion polymerized latex polymer using the monomer options listed in the Hen reference. A homopolymer of butadiene is known in the art to have a low glass transition temperature. The polymerized beta-carboxyethylacrylate acrylic oligomer is also known in the art as having a low glass transition temperature. Polymerized acrylic acid and styrene are known as having high glass transition temperatures; acrylic acid is considered to have a higher $T_g$ than styrene. Therefore, a latex was designed to have a high $T_g$ by using small amounts of soft monomer and large amounts of hard monomer.

Latex polymer B from Affidavit I is prepared with 25 parts of butadiene which is the least amount of butadiene allowable under the options listed in the Hen reference. The least amount of beta-carboxyethylacrylate acrylic oligomer possible under the options listed in the Hen reference is 0.5 percent of beta-carboxyethylacrylate acrylic oligomer, thus only 0.5 percent was used of the

acryloyloxycarboxylic acid. The $T_g$ of homopolymerized acrylic acid is higher than the $T_g$ of polystyrene, therefore, 9.5 percent acrylic acid was used as the hydrophilic monomer listed and the final monomeric component is 65 parts of styrene.

Affidavit I represents the results of the differential scanning calorimetry of the latex; the $T_g$ of the Hen reference latex polymer, designed to be as high as possible, is only 34.6°C. Thus, a latex prepared by the monomers taught by the Hen reference, even one having a $T_g$ designed to be as high as possible, is only 34.6°C, whereas, in the present application, Claim 18 requires that the $T_g$ of the latex be at least about 80°C.

Further, Affidavit II represents that when formulated as a component in a ceiling tile, the latex prepared by the monomers designated in the Hen reference does not perform as well as the latex of the present invention. The sag resistance of the latex prepared by the monomers taught in the Hen reference is poor compared to the Latex A of the present invention. The present Claims require that the latex have a glass transition temperature of at least about 80°C and the composite board prepared with the latex sag less than 0.8 mm. The composite board prepared with the Hen latex has a

$T_g$ far below 80°C, 34.6°C; and sags more than 0.8 mm, 0.952 mm average, (the average of 1.090 and 0.812 from Affidavit II is 0.952 mm).

Inasmuch as all formal requirements have been met and the claims as they now appear are believed to be in proper condition for allowance, allowance of all pending claims is respectfully solicited.

Respectfully submitted,

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